## REMARKS

Applicant respectfully requests favorable reconsideration of this application in view of the foregoing amendments and following remarks.

**Objections and Rejections Pertaining to Form**

In Section 1 of the Office Action, the Office asserted that Figure 1 should be designated by a legend such as – PRIOR ART --. Applicant has amended Figure 1 accordingly.

In Section 2 of the Office Action, the Office objected to the drawings because they included reference signs 200, 300, 400, 500, 600, 700, 800, 825 and 900, not mentioned in the descriptions. Applicant has amended the specification in order to add mention of these reference numerals.

In Section 3 of the Office Action, the Office further objected to the drawings because reference numeral 311 located after reference numeral 333 in Figure 3 should be relabeled as reference numeral 335 in order to match page 25 of the specification; "if" should be "is" in step 641 of Figure 6C; and reference numeral 924 in Figure 9B should be relabeled as reference numeral 935 in order to match page 56 of the specification. Applicant submits herewith proposed drawing corrections in accordance with the Office's remarks.

In Section 4 of the Office Action, the Office objected to the specification because of the following informalities: On page 27, line 12, step 343 should be step 331; on page 28, lines 7 and 10, Mol should be MOL; and on page 59, line 3, step 951 should be step 952.

Applicant has made the suggested corrections in the amendments above.

In Section 5 of the Office Action, the Office objected to claim 5 as having improper dependence.

Applicant has herein cancelled claim 5, thus rendering this objection moot.

In Section 6 of the Office Action, the Office objected to claim 32 indicating that it should depend from claim 31 and not claim 21. Applicant has amended claim 32 accordingly.

In Section 7 and 8 of the Office Action, the Office rejected claims 3-5, 12-16, 19-28, 32, and 34-38 under 35 U.S.C. §112, first paragraph, asserting that claims 3,

19, and 34 do not disclose for what the variables in the equation stands. The Office asserted that the objection can be overcome by including in the claim a description of the equation variables.

Applicant has herein amended the claims in accordance with the Office's request. As a peripheral issue, however, Applicant notes that this rejection is actually a rejection under 35 U.S.C. § 112, second paragraph, not first paragraph. Particularly, there does not appear to be any assertion that the specification is not enabling, merely that, as a matter of form, the claims should include the definitions of the variables.

In Section 9 of the Office Action, the Office rejected claims 3-5, 12-16, 19-28, 32 and 34-38 under 35 U.S.C. §112, first paragraph, asserting that claims 3, 19 and 34 disclose an equation which includes the term "M!," whereas the specification (page 20, line 12 – page 21, line 13) has the term as "Mi," and even furthermore, Figure 3A shows the term as "Mi!". The Office noted, however, that it will interpret the term to be "Mi!"

Applicant has amended the specification and claims 3, 19 and 34 to consistently use the term "Mi!" Once again, as a peripheral matter, this appears to be a rejection under 35 U.S.C. §112, second paragraph, not first paragraph. Particularly, the Office does not appear to question that it is apparent from the application that "M1!" Is the intended term. It is just that there are one or more typographical errors in the application.

In Section 10 of the Office Action, the Office rejected claim 21 under 35 U.S.C. §112, first paragraph, asserting that claim 21 discloses a second set of virtual pipelines, whereas a first set was never mentioned. Furthermore, the Office noted that, in claim 17, from which claim 21 depends, a set of virtual pipelines was disclosed, but it is not clear if that set is the first set or an additional set of pipelines. The Office indicated that it would interpret claim 17 to read that the set of pipelines is the first set of pipelines. The Office's proposed interpretation of the claims is correct. Applicant has amended claims 17 and 21 in accordance with the Office's remarks. Once again, as a peripheral matter, this appears to be properly classified as a rejection under 35 U.S.C. § 112, second paragraph, not first paragraph.

In Sections 11, 12, 13 and 16, the Office rejected claims 9-11, 21, 22 and 32 under 35 U.S.C. § 112, second paragraph, because the numbering of the steps in the claims was deemed to be improper. Particularly, for example, with respect to claim 9, which depends from claim 7, the two added steps are labeled as steps 9 and 10, whereas claim 7 only has steps 1 through 6. The Office asserted that the steps in claim 9 should be renumbered as steps 7 and 8, rather than 9 and 10. Similar rejections were asserted against the other above-mentioned claims.

Applicant respectfully traverses, but is willing to amend the claims as suggested by the Office if the Office maintains this rejection. Applicant traverses because Applicant's undersigned counsel, since 1987, has consistently written method claims so as not to reuse step numbers within a claim set. Particularly, for instance, step numbers 7 and 8 were used in dependent claim 8. Therefore, Applicant's counsel would not use those numbers again in any claim in the same claim set (a claim set comprises an independent claim and all of the claims that depend from it). This has simply been a matter of form because Applicant's counsel believes it to be more confusing to reuse step numbers within a claim set. To the best of Applicant counsel's recollection, he has never received a rejection based on this practice.

Since the step numbers do not contain any implication as to the order in which the steps are performed, the purpose of the numbers is purely and merely as a shorthand reference to previously recited steps. That is, if the step needs to be referred to again in a later claim, it can be referred to as "step 9", rather than "the step of identifying a second set of virtual pipelines for which traffic is less than said predetermined threshold." As such, the step numbering convention chosen by Applicant in this case does not raise any ambiguity or other problem with the claim. Accordingly, Applicant respectfully requests the Office to withdraw this rejection.

In Section 14 of the Office Action, the Office rejected claims 14 and 25. These claims have been cancelled and, therefore, the rejection is moot.

Finally, in Section 15 of the Office Action, the Office rejected claims 20 and 34 because they refer to "equation 2A" and "equation 2B," rather than printing the actual equations. This was a clerical error on Applicant's part and Applicant has

herein amended these claims to include the actual equations (as was Applicant's original intent).

**Prior Art Rejections**

The Office rejected all of the independent claims, claims 1, 17, 29, under 35 U.S.C. §103(a) as unpatentable over Berger in view of Selinger. In addition, the Office: (1) rejected dependent claims 2, 18, and 33 as unpatentable over Berger in view of Selinger as applied to claim 1 and further in view of Jurkevich; (2) claims 3-5, 12, 13, 15, 16, 19-24, 26-28, and 34-36 as unpatentable over Berger in view of Selinger in further view of Jurkevich as applied to claims 2, 18, and 33 and further in view of Applicant's admitted prior art; (3) claims 6, 7, 9-11, 30, and 31 as unpatentable over Berger in view of Selinger as applied to claims 1 and 29 and further in view of Matthews; (4) claims 8 and 32 as unpatentable over Berger in view of Selinger in further view of Matthews as applied to claims 7 and 31 and further in view of Fedyk; and (5) claims 37 and 38 as unpatentable over Berger in view of Selinger in further view of Jurkevich in further view of Applicant's admitted prior art as applied to claim 36 and further in view of Matthews.

**A. The Present Invention**

The present invention pertains to methods and apparatus for determining network congestion and relieving that congestion by reconfiguring pipeline bandwidths. In the particular embodiment described in the specification in connection with Figure 3, for each virtual trunk group (VTG), the fraction of blocked calls is compared to a threshold level of blocked calls. If the VTG is experiencing less call-blocking than the threshold level, then it is possible that some of the bandwidth from the VTG can be reassigned to another VTG. Accordingly, the system calculates the necessary channel capacity of the VTG needed to keep the call-blocking level below the call-blocking threshold. Then, a peak cell rate for a VTG of that size is computed. If the actual peak cell rate of the VTG can be renegotiated, then the bandwidth allocated to the VTG is reduced to accommodate the calculated minimum VTG size to keep the call-blocking rate below the threshold.

If this is not possible, then it is determined if a path exists that can accommodate a VTG having the calculated peak cell rate. If so, such a new VTG is created and all new calls will be directed to the new VTG. The old VTG will be deleted when no calls are using it any longer.

On the other hand, if the call-blocking rate for a VTG exceeds the call-blocking threshold, the minimum increase in VTG size that will reduce the call-blocking rate below the threshold is determined. All the VTGs that are overutilized are added to a list. For each VTG on that list, a peak cell rate for the desired size of that VTG is determined. If the peak cell rate of that VTG can be renegotiated in the particular network, the bandwidth of the VTG is increased accordingly. If, on the other hand, the network cannot renegotiate VTG size, it is determined if a path exists that can accommodate a new VTG having a size equal to the calculated size. If so, such a VTG is created and all new calls are directed to the VTG. When no calls are using the old VTG anymore, the old VTG is deleted.

If there is no such path that can be created, then a peak cell rate is calculated for a VTG size equal to the difference between the current size of that particular VTG and the size that is necessary in order for it to reduce its call-blocking ratio below the threshold. Then, if possible, a new VTG of that size is created and a proportion of the calls from the old VTG are directed to the new VTG.

**B. <u>The Berger and Selinger References</u>**

The Office asserted that Berger discloses a method and apparatus for reconfiguring pipeline sizes in order to relieve congestion in a packet-based network comprising a plurality of gateway nodes and utilizing the concept of virtual pipelines comprising steps and apparatus for: (1) identifying congested links (Col. 4, lines 63-67; Col. 6, lines 13-31; and Col. 7, line 8-Col. 8, line 63); (2) for virtual pipelines that are congested, determining pipeline size that would cause said traffic through said pipelines to not be congested (Col. 3, lines 6-33; Col. 6, lines 13-31; and Col. 7, lines 8-21); and (3) for each pipeline that can be increased in size, increasing its size to said size determined in step (2) (Col. 4, lines 63-67; Col. 6, lines 13-31; and Col. 7, line 8-Col. 8, line 63). The Office acknowledged that Berger does not disclose

identifying the first set of virtual pipelines for which traffic exceeds a predetermined threshold.

However, the Office asserted that Selinger discloses, in a system for improving access to congested networks, that congestion is defined as traffic on the link exceeding a defined limit of congestion (threshold) (Col. 1, line 66-Col. 2, line 9). The Office asserted that, since congestion is defined as traffic exceeding a defined limit of congestion (threshold), it would have been obvious to identify the congested links as being the first set of virtual pipelines for which traffic exceeds a predetermined threshold.

Applicant respectfully traverses this rejection. Berger does not teach that for which it has been cited by the Office. Particularly, the Office asserted that Berger teaches identifying congested links and determining a pipeline size that would cause traffic through the link to not be congested. This is not accurate. Berger has nothing to do with dynamically resizing virtual pipelines or detecting network performance criteria. Berger does not determine network performance criteria and resize pipelines based on such information. Rather, Berger relates to a one-time determination of the initial network bandwidth allocation as the network is being designed. Thus, all of Berger's calculations are based on assumptions as to expected network traffic, not measured network traffic. See, for instance, col. 6, lines 16-25:

> An overall candidate network topology is analyzed based on a forecasted point-to-point traffic demand that is to be routed across the network. The traffic demand is defined in terms of the number of simultaneous flows of connections that are to be supported in a given load-set period so the number of concurrent flows/connections that are to be supported on each link of the network can be determined. The technique of the present invention focuses on a single link in a network and assumes that all of the flows/connections traversing the link are bottlenecked at the link.

See also col. 7, lines 8-12:

> The present invention also assumes the network 300 is heavily loaded because, for dimensioning, the relevant case is when network resources, as opposed to end-system resources, are the limiting factor for the throughput obtained for elastic/data connection.

See also col. 7, lines 22-28:

> According to the present invention, the link bandwidth is sized, or dimensioned, based on a forecast of a number of connections that could be present simultaneously on the link during a busy period. The number of connections is referred to as N. For example, in Fig. 3, the link 302 between Chicago and New York should have the capacity to support N=1,000 connections simultaneously.

See also col. 9, lines 15-20:

> Expected realistic values of the input parameters satisfy this check, though one can conceive of values that do not in which case the method does not pertain, 412. Given that the input parameters appropriate the bandwidth is dimensioned according to an equation (5), 414.

Accordingly, contrary to the Office's assertions, Berger does not teach "(1) identifying the first set of virtual pipelines for which traffic exceeds a predetermined threshold", "(2) for each virtual pipeline in said set, determining the pipeline size that would cause said traffic through said pipeline to not exceed such predetermined threshold", and "(3) for each pipeline in said set that can be increased in size, increasing its size to said size determined in step (2)".

These are essentially all of the limitations of claim 1. Accordingly, claims 1 clearly distinguishes over Berger.

Independent claims 17 and 29 contain essentially the same limitations as claim 1 and, therefore, distinguish over Berger for the same reasons as claim 1.

The Office has cited Selinger merely for the purpose of its alleged teaching that congestion is defined as traffic on a link exceeding a defined limit of congestion, which the Office asserts is a "threshold". Thus, even assuming that this is an accurate description of the teaching of Selinger, it does not address the above-discussed shortcomings of the primary reference, Berger.

All other claims in the present application depend of one of the aforementioned independent claims 1, 17, and 29. Therefore, all claims distinguish over the prior art of record for at least the same reasons.

The tertiary and further prior art references applied against the various dependent claims do not add the teachings missing from Berger.

In addition, at least some of the dependent claims add even further distinguishing features over the applied prior art. For instance, with respect to claims 4, 20, and 35, the Office appears to be relying on alleged admissions made by Applicant contained on page 20, line 6 through page 22, line 17 of the application as to the content of the prior art. However, pages 20-22 are within the Detailed Description of the Invention section of the application. Applicant has reviewed those pages and found nothing that appears to suggest that applicant believes any of the content disclosed therein is in the prior art except that the Erlang blocking formula is known (which does not pertain to the subject matter claims 4, 20, and 35).

Furthermore, dependent claims 21 and 36 add the steps of identifying a second set of virtual pipelines for which traffic is less than said predetermined threshold and, for each pipeline in said second set, determining the size of the smallest pipeline that can accommodate the traffic present in that pipeline. The Examiner asserts that this is found in Berger, col. 7, lines 8-20. However, as discussed above, Berger does not make any determination of the amount of traffic in any pipeline. Berger is based entirely on speculation as to projected traffic during the design phase of the network, not measurements of traffic during operation of the network.

With respect to claims 6 and 30, which add the steps of, for each pipeline that cannot be resized, determining if a path exists that can accommodate a pipeline of said size determined in step (2), and creating a pipeline having said size and directing all new channels between the corresponding gateway nodes through said newly created pipeline. The Office asserted that this is taught in "Matthews et al. (U.S. Patent No. 6,104,705)" at col. 3, lines 22-42, col. 3, lines 48-52, and col. 4, line 44-col. 5, line 4.

There is some question as to whether the Office Action has correctly identified the prior art reference that it is applying against claims 6 and 30. As noted above, the Office Action refers to the reference as "Matthews et al. (U.S. Patent No. 6, 104,705)". However, U.S. Patent No. 6,104,705 does have an inventor named Matthews. In addition, there is no reference of record in this case in which an

inventor is named Matthews. However, there is a reference bearing the indicated patent No. (in which the first-named inventor is named Ismail).

Applicant has reviewed the cited portions of the Ismail reference. Ismail relates to assigning priorities to different video streams and assigning bandwidth in the network to each video stream based on the assigned priority. Particularly, a controller uses the priorities to send feedback signals back to the different video transmitters requesting the transmitters to either adhere to, increase, or decrease their respective video data rates by changing parameters controlling the video encoding process, such as resolution and frame rate. Col. 4, lines 44-52. This does not appear to have any relationship to adding virtual pipelines and directing channels to those pipelines as claimed in claims 6 and 30 and the purpose for which the reference has been cited.

Accordingly, claims 6 and 30 further distinguish over the prior art of record.

With respect to claims 7 and 31, which depend from claims 6 and 30, respectively, and add the step of deleting each pipeline in said second set for which a new pipeline was created in step (5) when no channels are utilizing said pipeline, the Office has asserted that this is shown in the same sections of "Matthews". As noted above, there is no "Matthews" reference of record and U.S. Patent No. 6,104,705 does not contain anything pertinent to what is claimed in claims 6, 7, 30, and 31. hence, these claims even further distinguish over the prior art of record.

Dependent claims 9, 10, and 11 depend from claim 7 and pertain to an alternate technique for relieving congestion in which underutilized pipelines are reduced in size or, if they cannot be reduced in size, they are deleted in favor of a new pipeline over a path that can accommodate a pipeline of the selected reduced size. With respect to claim 9, the Office asserted in sections 36, 37, and 38 of the Office Action that the steps of identifying the aforementioned second set of underutilized pipelines and determining a reduced size for that pipeline is found in Berger at col. 7, lines 8-20. However, as previously noted, Berger, col. 7, lines 8-20, teach essentially the opposite. Specifically, Berger discloses no measurement of traffic load on the network. Rather, everything is based on assumptions as to potential traffic load. Hence, claim 9 even further distinguish over the prior art of record.

With respect to claim 10, the Office asserted that Matthews, col. 3, lines 22-52 and col. 4, line 44-col. 5, line 4, teaches the step of determining if a path exists that can accommodate a pipeline of the reduced size determined in step (8). However, as previously discussed, Matthews teaches nothing of the sort in these sections.

Claim 11 depends from claim 10 and adds the steps of deleting a pipeline for which a new, smaller pipeline has been created, when no channels are utilizing the old pipeline. Again, the Office asserted that this is taught in the aforementioned sections of Matthews. However, as previously noted, these sections of Matthews have nothing to do with deleting pipelines.

Dependent claims 36, 37, and 38 generally correspond in substance to claims 9, 10, and 11, but depend from independent apparatus claim 29, instead of independent method claim 1. They additionally distinguish over the prior art of record for all of the same reasons discussed in connection with dependent claims 9-11.

**Conclusion**

In view of the foregoing amendments and remarks, this application is now in condition for allowance. Applicant respectfully requests the Examiner to issue a Notice of Allowance at the earliest possible date. The Examiner is invited to contact Applicant's undersigned counsel by telephone call in order to further the prosecution of this case in any way.

Respectfully submitted,

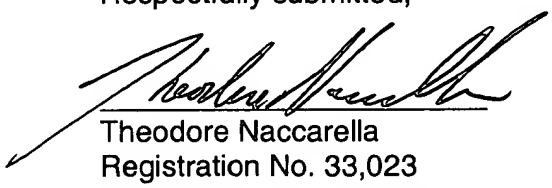

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FIG. 1 — PRIOR ART — ADDED

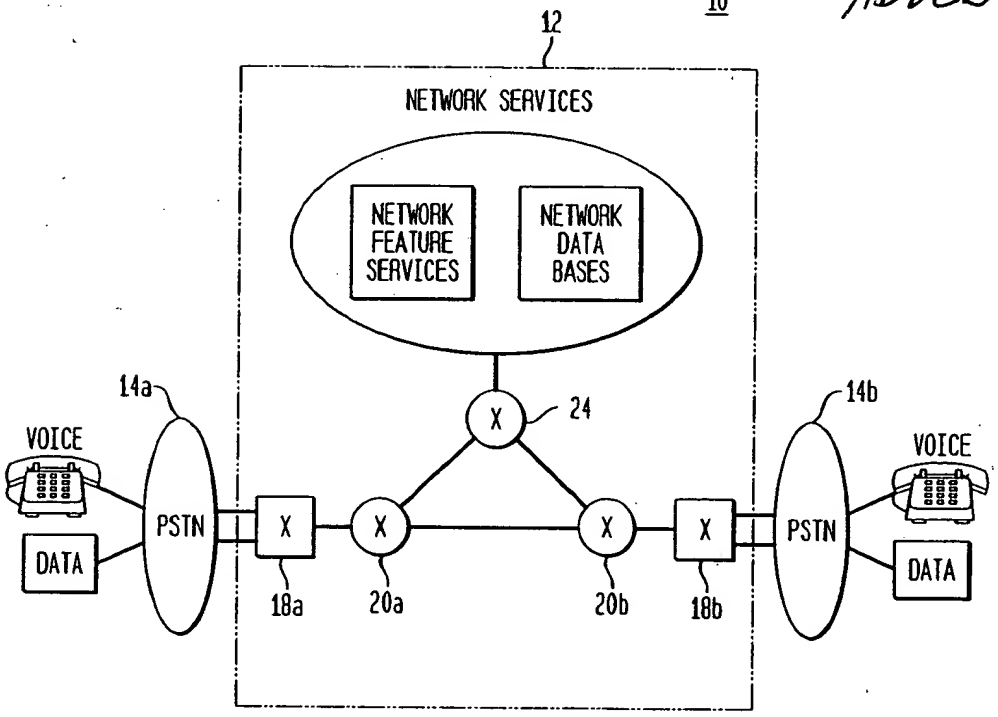

FIG. 1 -PRIOR ART-

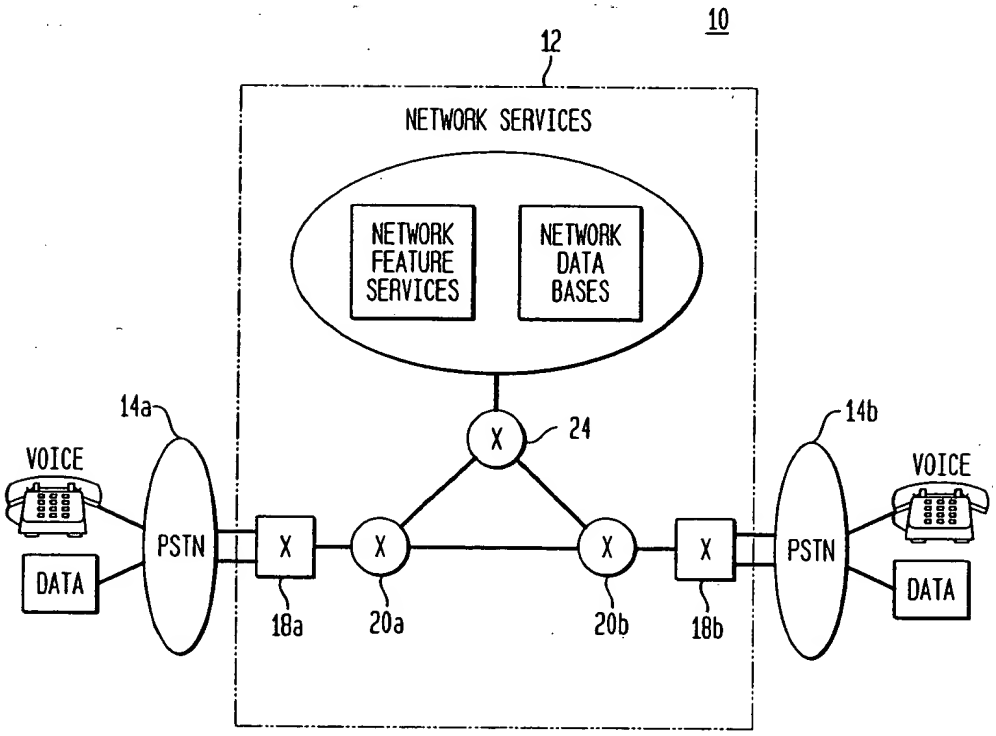

FIG. 3A

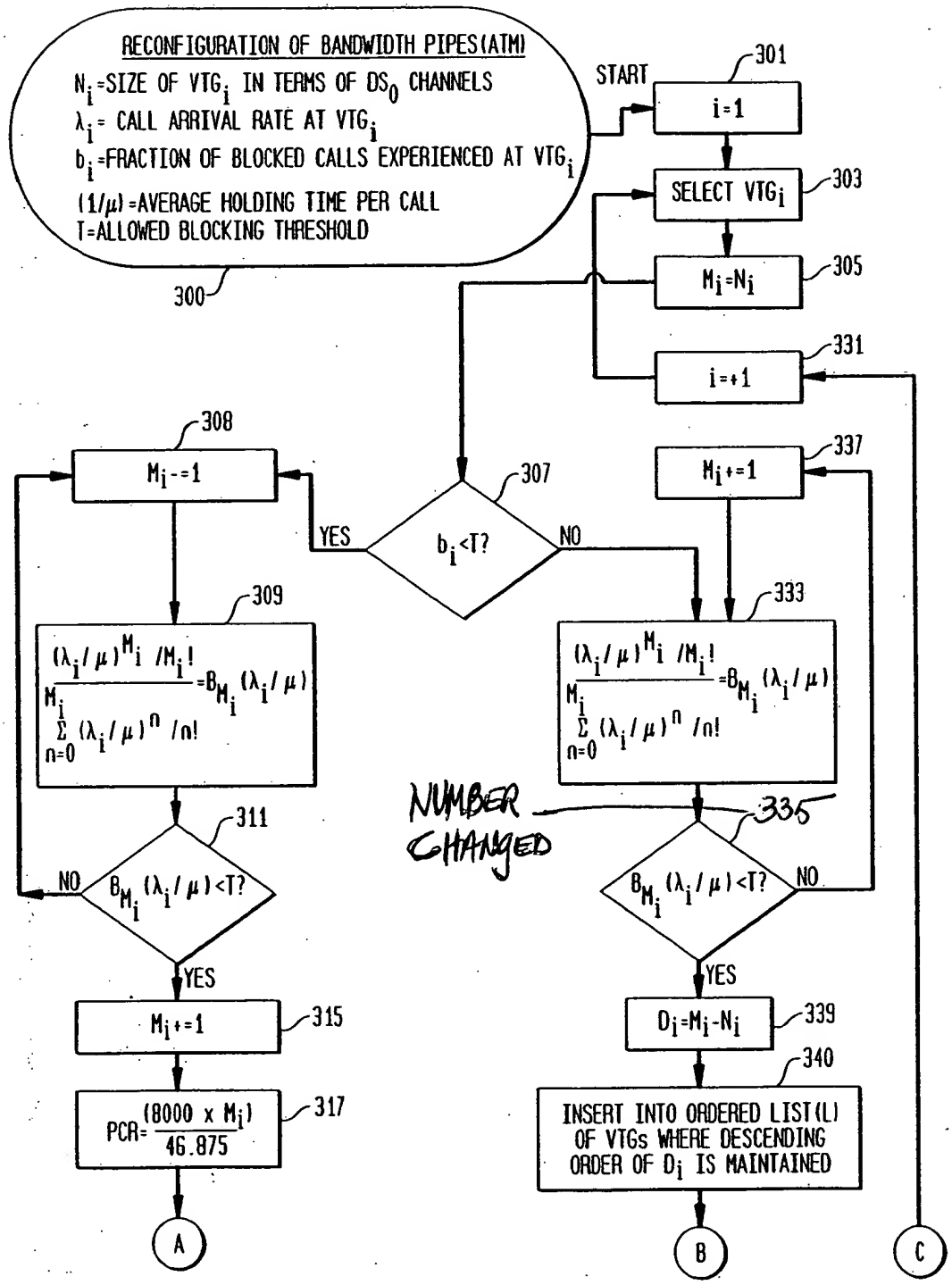

FIG. 3A

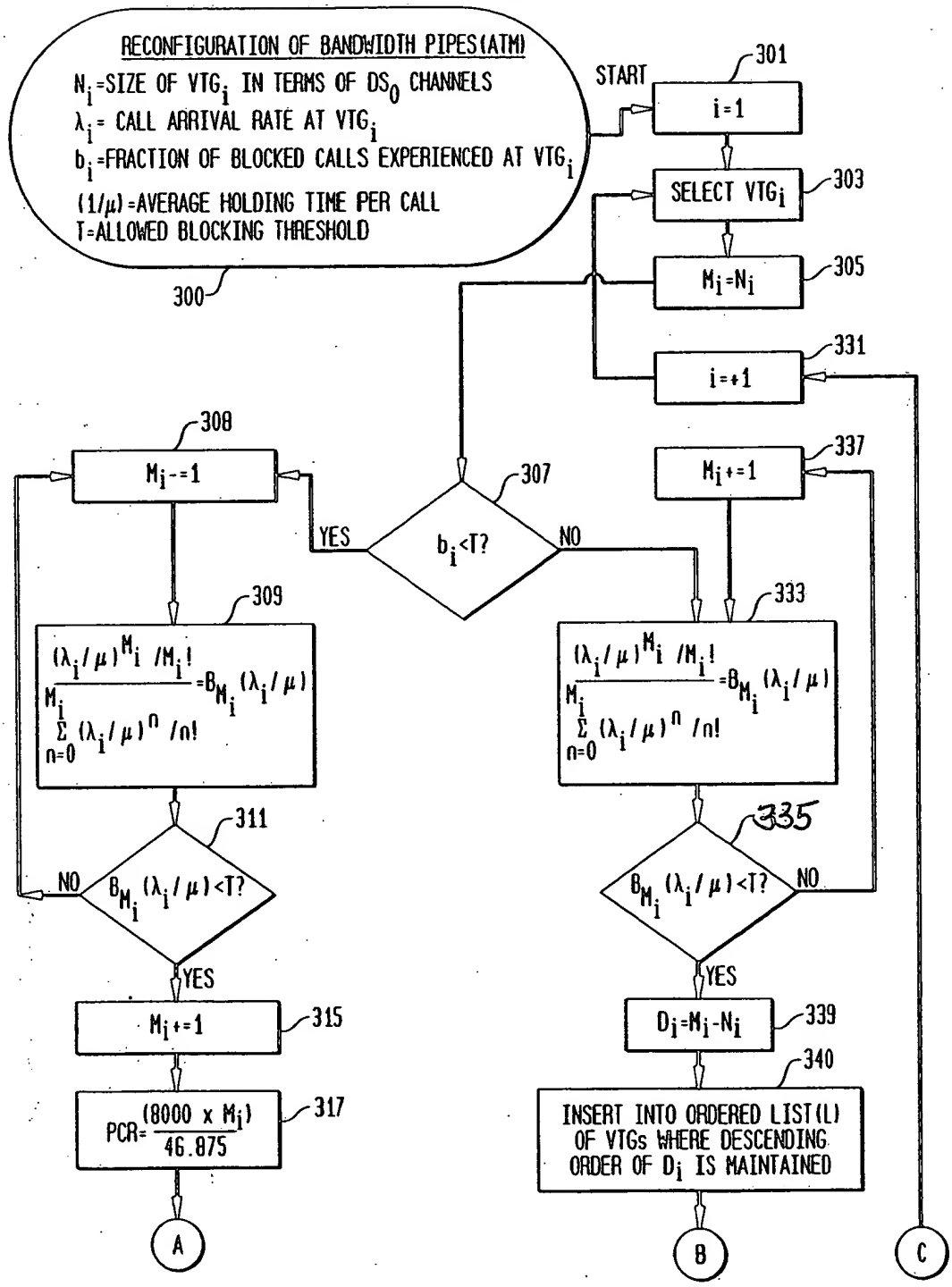

FIG. 6C

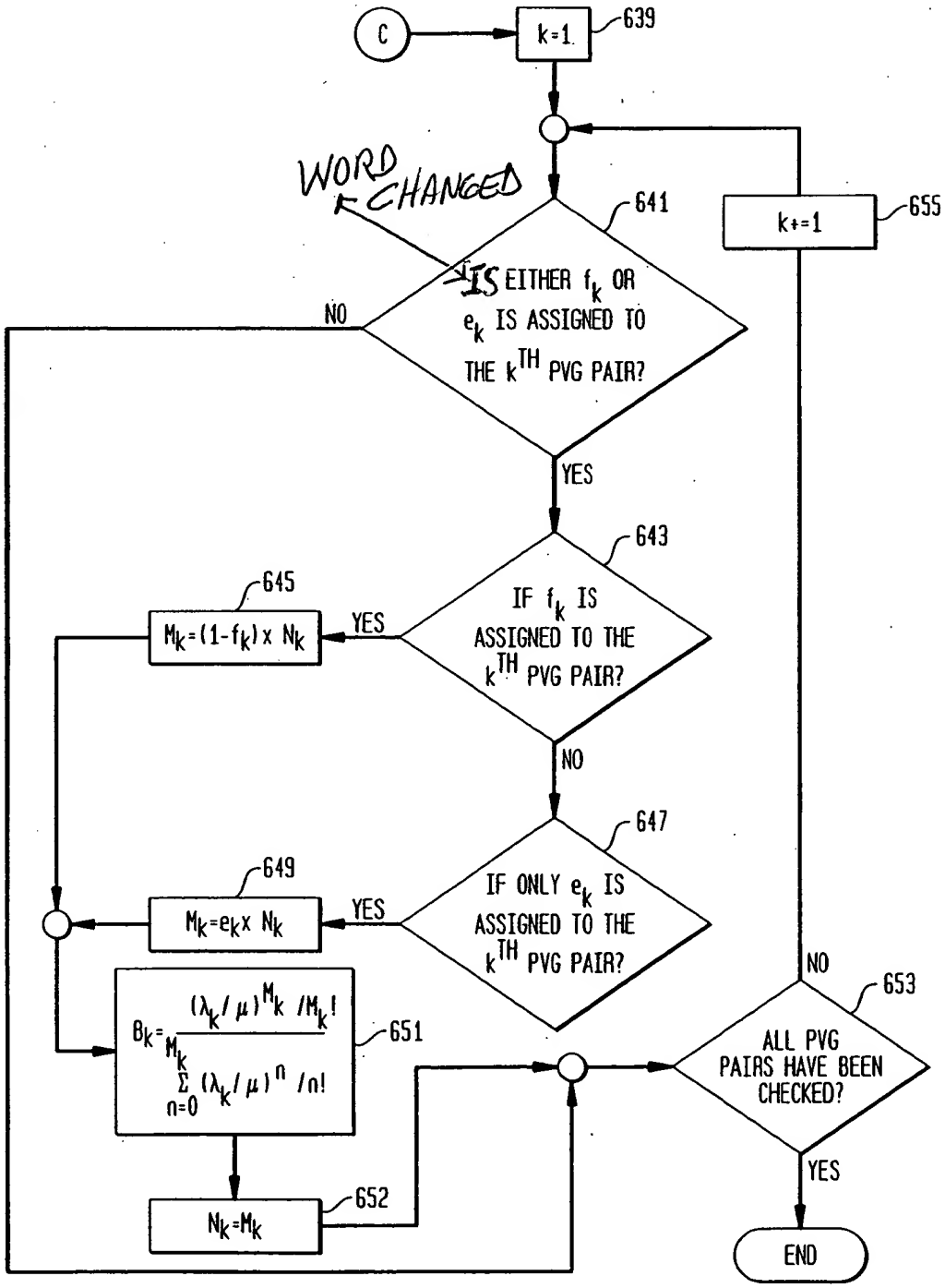

FIG. 6C

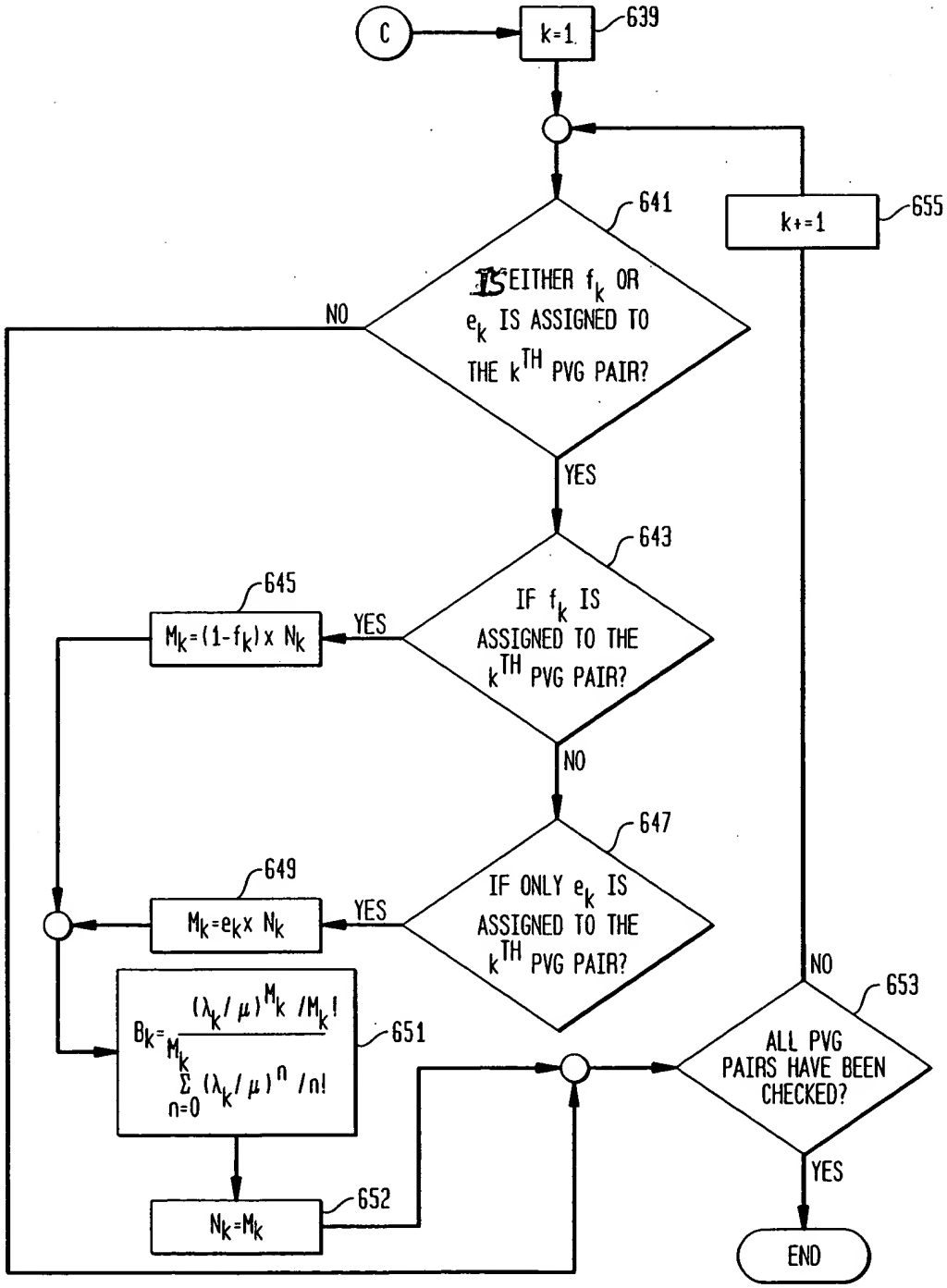

FIG. 9B

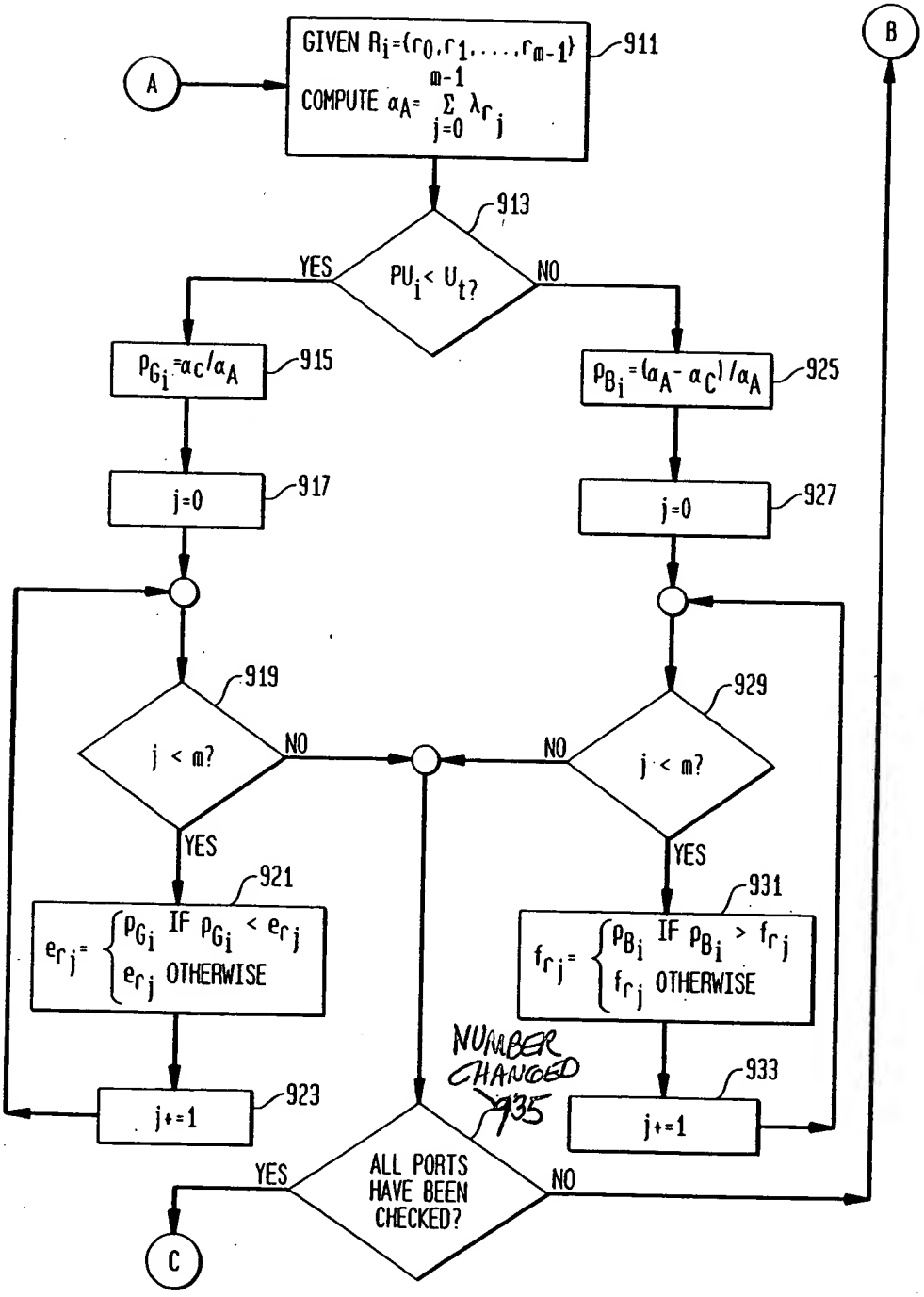

FIG. 9B